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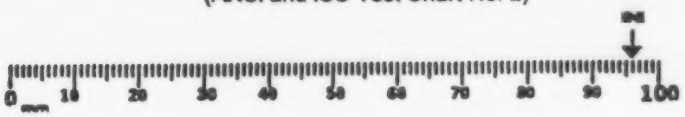

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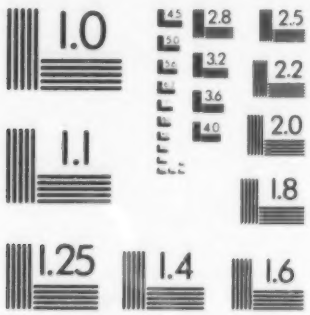

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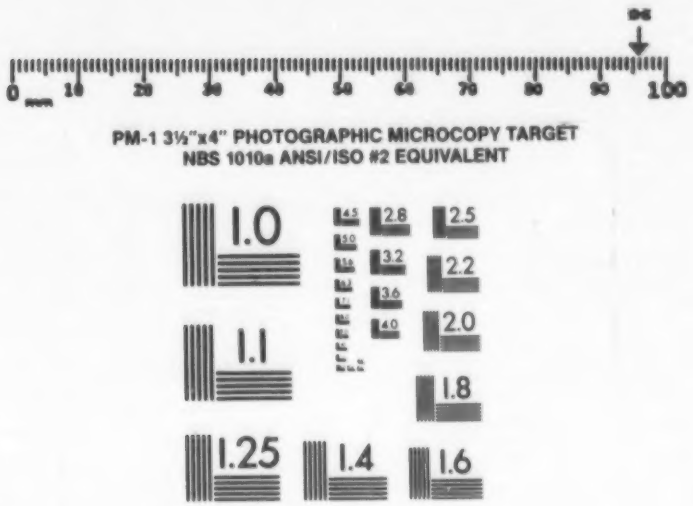

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We all have a Part to Play

A Sewage Management Paper

Province of Nova Scotia

101-04109/

We all have a Part to Play

It is my Personal

pleasure to present this discussion paper on improving the management of our sewage.

When it comes right down to it, sewage isn't the kind of thing many of us like to talk about. And if we don't want to talk about it, there is a good chance we don't want to think about it much either.

But the fact is, many people and places in Nova Scotia have home sewage disposal (on-site or septic) systems that aren't working properly. Others live in places where their sewage is going straight into the ocean or where their treatment plants need to be brought up to today's standards.

It's a big problem and if we don't start doing something about it now, it's not going to get any better. It's the kind of problem that we need to begin solving for ourselves, but just as importantly for our children and our grandchildren.

Today, you and I want to feel more confident that we aren't harming our environment and especially our drinking water. I think a good discussion of this topic will lead to viable options, which is the first step in developing a workable strategy. It is a huge challenge. But so was being the first - and only - province in Canada, to reach the goal of reducing our solid waste by 50 per cent last year. It is up to all of us to make this happen.

Thank you.

Sincerely,

David Morse

Honourable David Morse
Minister of Environment and Labour
Province of Nova Scotia

Making the

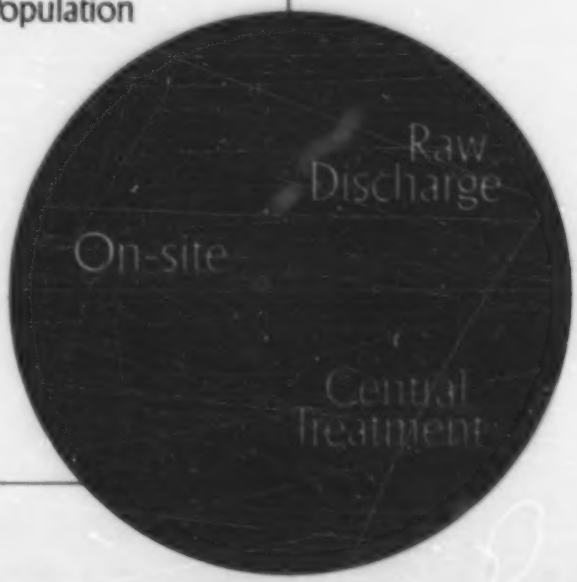
Approximately

one million people live in Nova Scotia, with each of us contributing sewage, or wastewater, to our environment. It happens every time we flush our toilets, shower, drain our sinks or wash our clothes. Homes, institutions, and commercial development, all contribute.

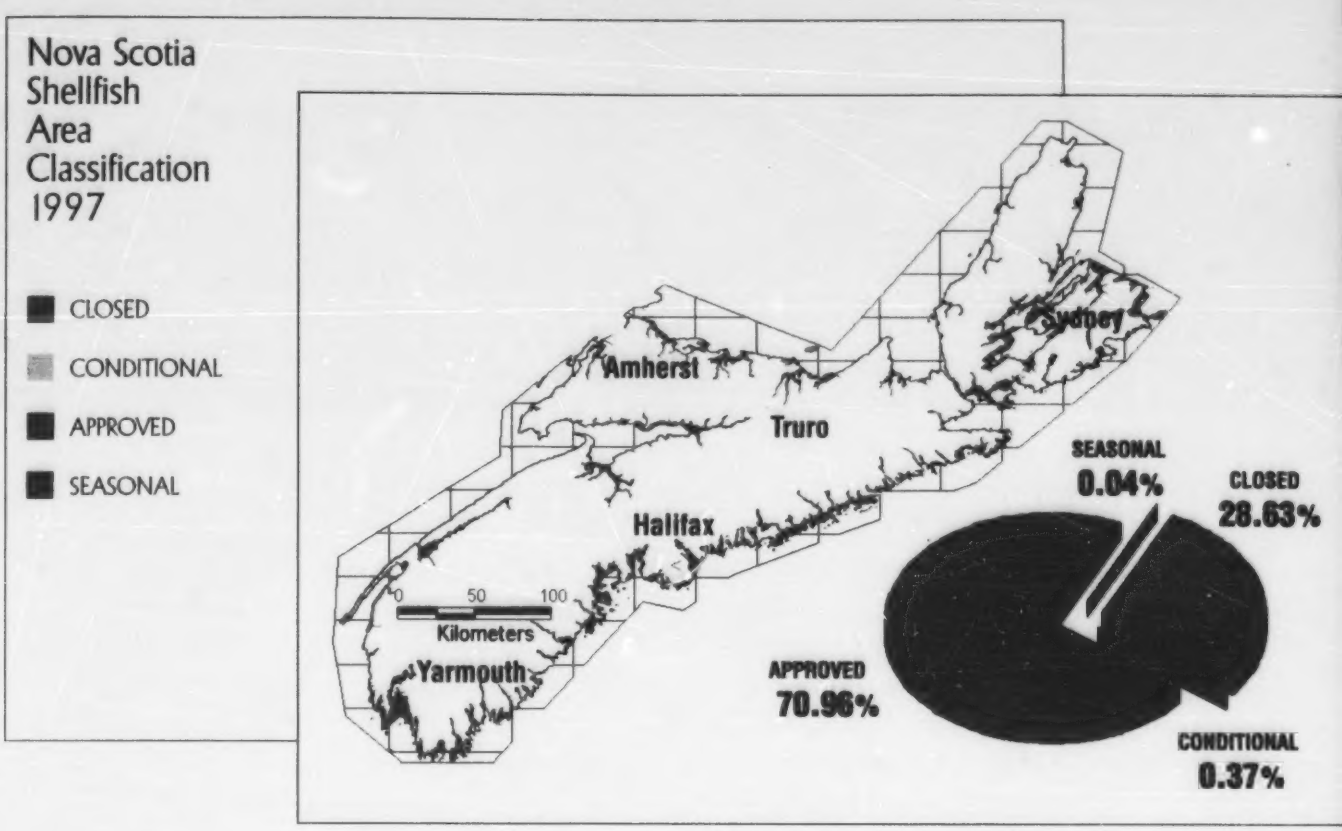
Today, 45 percent of Nova Scotians have their sewage treated and disposed of with home sewage disposal (on-site or septic) systems, 25 percent have their sewage collected and treated at a central treatment facility, and the remaining 30 percent of the population's sewage is collected and discharged raw into our rivers, estuaries and coastal waters.

Progress has been made over the past 25 years to improve the management of our sewage. A substantial number of treatment plants have been constructed since the 1970's and on-site regulations and guidelines have lead to improved home sewage disposal systems. Standards adopted for new sewage treatment facilities, and regulations requiring sewage treatment plants to have certified operators, have gone a long way to ensure improved environmental protection. Co-operative efforts between the province and municipal units have resulted in success stories such as Mahone Bay and Bear River.

Wastewater Management in Nova Scotia by Population



However, this has not been the case uniformly across the province, and much remains to be accomplished. Each summer beaches are closed to swimming. Our streams, estuaries and coastal waters are threatened



Shellfish harvesting areas continue to be closed as a result of bacteriological contamination, with untreated sewage and malfunctioning on-site systems being the principle source. Illustrated above are closure areas for 1997.

by *nutrient enrichment*, which is the excessive use of elements found in fertilizers, sewage effluent and agriculture that causes unwanted plant growth in water ways. Drinking water supplies have been contaminated and the aesthetics typically associated with raw discharges affect our ecotourism potential.

Shellfish harvesting areas continue to be closed as a result of bacteriological contamination, with untreated sewage and malfunctioning on-site systems being the principle source. Illustrated above are closure areas for 1997.

In addition to bacteriological contamination, sewage discharges contain nutrients, organic compounds, heavy metals, *endrocrine disruptors**, viruses and other contaminants that impact our waters.

As part of the Government of Nova Scotia's commitment to achieve water quality protection, stated in the Environment Act, we must address the challenges of sewage management. This will not come without considerable expenditure, yet we must strive to ensure the protection of the water we consume, use for recreational activities, and rely upon to support our shellfish harvesting industry.

We must provide a strong foundation for our ecotourism industry.

We must ask ourselves...

what is the cost of not protecting our waters?

what will we leave for future generations?

* *Endrocrine disruptors are substances that can cause changes in the growth, development, reproduction or behaviour of an organism that can affect the organism itself, or the next generation.*

Stating our purpose

Notwithstanding the progress made, serious issues remain with respect to raw discharges, malfunctioning on-site systems and central treatment facilities. The development and implementation of an workable strategy, agreed to by all the necessary players, is needed. The Nova Scotia Department of Environment and Labour is committed to the development of such a plan.

This discussion paper is the first step towards developing a sewage management strategy for the Province of Nova Scotia.

The paper will serve to...

1. increase awareness of the issues
2. solicit input from stakeholders at an early stage in the strategy development process.

The present state of sewage management in the province is not common knowledge to Nova Scotians. In fact, some may not even know how their own sewage is treated, disposed of, or the effects of improper management. This paper will provide Nova Scotians with a heightened awareness of the problems, propose potential options for consideration, and present questions which need to be answered.

In order to develop a strategy which meets the needs of the people and the environment, and leads to achievable solutions, Nova Scotians must have an opportunity to put forward their views.

This opportunity will come following the release of this discussion paper. Nova Scotia Department of Environment and Labour staff will conduct workshops around the province for six months. The results of this consultation process will form the basis for the development of the strategy. Within nine months of the end of the consultation process, a strategy will be developed.

What is Sewage Treatment?

Sewage is used water,

originating from a home or community. Sewage treatment is a process whereby contaminants such as pathogens, organic matter, and nutrients are removed from the sewage prior to discharging it back to the land or water. Treatment can be done using various methods.

HOME SEWAGE DISPOSAL SYSTEMS

Generally in rural areas, treatment for individual properties is a home sewage disposal system, often called a septic system. These consist of a septic tank for settling and treatment, and a sub-surface disposal field. The disposal field provides additional treatment by further removing solids including bacteria and other disease-causing organisms. Large on-site systems can serve several properties. This type of collection and treatment is referred to as a cluster system.

If properly constructed, maintained and operated, both of these treatment and disposal methods have the ability to protect human health and the environment. When the systems are not properly designed, constructed or managed, problems arise.

CENTRAL COLLECTION AND TREATMENT FACILITIES

Many municipalities or communities collect sewage through a network of underground pipes and deliver it to a centrally operated treatment facility. The treated sewage, or effluent, is then disinfected and discharged to a body of water.

Methods of treatment include physical, biological, and chemical processes used either alone or in combination. The selection of the processes depends on which contaminants must be removed, and to what extent, such that the environment is protected.

Primary treatment includes physical operations such as screening and sedimentation to remove floating and settleable solids found in sewage. In secondary treatment, biological and chemical processes are used to remove most of the suspended or dissolved organic matter. In advanced or tertiary level treatment, additional combinations of methods of treatment are used to remove other constituents such as phosphorus or nitrogen.

On-site Sewage Disposal Systems

Where central

collection and treatment systems are not available and suitable soil conditions exist, on-site disposal systems provide a good alternative. Properly designed and maintained, they can provide years of simple, economical and effective sewage treatment.

In one subdivision

One Nova Scotian subdivision, serviced with on-site sewage disposal systems and individual wells illustrates what can happen when systems fail.

In this subdivision, the homes are all about 15 years old. Of the 52 homes, 23 had their septic tanks pumped out in the past five years as recommended.

Twenty-nine were not aware of any maintenance having been carried out on their systems and six residents noted problems with their on-site systems.

As a result of leaking septic systems, 13 wells showed fecal contamination in their drinking water. In circumstances such as these, not only are the on-site systems in need of repair or replacement, safe drinking water supplies have been jeopardized.

Approximately 45% of the province's population is serviced with home sewage disposal (on-site or septic) systems. Some of these systems, or discharge pipes, were installed when few regulatory controls over on-site disposal systems existed. The remainder were installed under regulations that came into effect in 1975, or under the design guidelines of 1985, which resulted in improved systems. More recently installed systems are much less likely to fail than those of the past, and provide a much higher level of environmental protection.

However, failures still occur. Common causes include...

- Improper design or installation
- Lack of routine cleaning of the septic tank
- Carryover of solids to the disposal field
- Improper use of the system
- Vehicular traffic impact
- Damage from improper landscaping

These failures can be avoided.

Failing disposal systems can have a significant effect on our environment. They constitute a health risk when discharging to roadside ditches, cause beach closures, contribute to the contamination of shellfish harvesting areas, and accelerate the rate of *eutrophication** in our lakes, rivers and estuaries. Failing on-site systems also contribute to contamination of our drinking water. The existing regulatory system does provide a basic framework, yet does not

address all the issues. The Nova Scotia Department of Environment and Labour regulates the design and installation of new systems and has the legislative authority to ensure that any malfunctioning systems are repaired or replaced.

HOMEOWNERS ARE RESPONSIBLE FOR PROPERLY MAINTAINING THEIR OWN INDIVIDUAL ON-SITE SYSTEMS.

Question

- *What should be the relative responsibilities of the individual homeowner and the Nova Scotia Department of Environment and Labour, in ensuring adequate maintenance of on-site systems?*

Question

- *Is an enhanced inspection, or enforcement role required on the part of government or should the sole responsibility for the maintenance and operation of on-site disposal systems be left to the individual homeowner, with the Department providing a supporting educational program?*

Question

- *Should Wastewater Management Districts be more actively encouraged and if so, how?*

Question

- *Should some level of government assist with loans or grants for the replacement or upgrade of an on-site system as they do for central collection and treatment systems?*

A typical home sewage disposal system and drinking water well set-up.

* *Eutrophication refers to a natural ageing process of water bodies whereby nutrients cause excessive plant growth and spoils lakes for human uses such as drinking water supply, fishing, swimming, and boating.*

One Sewage Management Option

While seeking to find solutions to the problems associated with sewage management, and on-site disposal systems in particular, there are various strategies which can be entertained.

One approach being used in Nova Scotia is the Wastewater Management District (WMD). In a geographic area designated by a municipal by-law, a WMD gives the municipality the authority to manage, repair or replace all systems as required.

It doesn't have to be limited to individual on-site systems, but can incorporate a combination of individual on-site systems, cluster systems, holding tanks, and other central treatment facilities. A WMD means increased costs for those who aren't practicing good management of their septic systems.

All property owners within a WMD are obligated to contribute to a WMD fund through annual fees or taxes. This fund then covers the cost of regular maintenance and capital costs for failed systems, saving an individual homeowner an initial, high capital expenditure.

A management system such as this will result in fewer malfunctions, by ensuring that regular monitoring and professional maintenance take place. The new Municipal Government Act recognizes the value of these systems and enables municipal units to establish a WMD.

Central Collection and Treatment Facilities

In the mid 1960's

Nova Scotia prohibited the construction of new outfall pipes discharging raw sewage, leading to the construction of 55 municipal treatment facilities in the early 1970's. Today, there are 290 sewage treatment plants in the Nova Scotia, about one-third are municipally owned, with the remainder servicing schools, trailer parks, federally owned lands, and commercial development.

This alone, indicates that progress has been made over the years in the area of sewage treatment. However, there are concerns with a substantial portion of these systems. Many of the collection and treatment systems are ageing. Collection systems are leaking, compromising the ability of the treatment plant to perform efficiently and causing pumping stations to overflow. In areas where there are combined sewers*, overflows of raw sewage occur during rainfall events. Ageing treatment facilities are in need of repair or replacement as they may not be capable of providing the necessary level of treatment that today's standards require. The costs associated with rehabilitating collection systems or separating combined sewers into two collection systems is extremely high.

Although some treatment facilities suffer from lack of operator attention, progress has been made in this area. In 1995, the Nova Scotia Department of Environment and Labour established a mandatory operator certification program, requiring all facility owners to have the facility under the direct charge of a certified operator. This program has been successful in providing many facilities with the required operator attention, and in raising the awareness of the need for such, with facility owners.

With respect to discharge requirements and the monitoring of treatment plants, the record is not good. The level of monitoring and reporting conducted by the owner varies from facility to facility, usually as required in the approval issued by the department. With many of the older facilities having either no approval, or one that was issued prior to the adoption

of effluent standards, there are no discharge limits, monitoring, or reporting requirements. The Nova Scotia Department of the Environment and Labour recognizes this as an area of serious concern and is developing a plan to address this. As this plan is developed and implemented, questions on enforcement of it will be brought to the forefront.

The release of toxic substances such as trace metals, chemicals or toxic organics into sewers can:

- carry over to the receiving waters (like rivers, lakes, streams and oceans)
- make a treatment facility unable to function properly
- contaminate sludge which must be ultimately disposed of.

For these reasons, it is important to control what is being discharged to the sewers. A source control program prevents the release of substances such as household cleaners, commercial chemicals and industrial by-products. It can provide the required added environmental protection as well as offer a less expensive alternative to treatment of contaminates in the sewage or sludge.

Question

- *Should the province encourage source control of pollutants by incentives or by regulation?*

Question

- *How should the requirements for compliance with effluent standards, monitoring and reporting be dealt with?*

Question

- *Should restrictions be placed on collection system extensions or any new development when the required approvals are not being met by the owner?*

Question

- *Should there be penalties when facilities do not meet monitoring, reporting, or discharge requirements?*

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* *Combined sewers collect both domestic sewage and storm drainage, and are generally found in older communities. They are prohibited under today's standards.*

Servicing New Developments

Large Scale

developments with on-site systems do not always receive the same emphasis in terms of planning, as do developments on centralized treatment facilities. Before sewage treatment plants are constructed, studies evaluate the type of facility, its location, the ultimate population it is designed to serve and potential effects on receiving water.

On-site development, on the other hand, often occurs piece-meal and the full impact of development is not considered until it is too late. There are also overlapping jurisdictions regarding on-site systems and planning. The Province, through the Nova Scotia Department of Environment and Labour, is responsible for the approval of on-site systems while municipalities are responsible for land-use planning and development controls. Both the province and municipalities must work together to ensure problems do not arise with large-scale development.

Consideration for projected growth, underlying soil conditions, potential water problems and effect on receiving waters should be given, before certain threshold levels are reached with new large-scale development.

Where development occurs using on-site systems, better steps could be taken to ensure that sewage-related problems do not arise. This could include, for example, a requirement for concept plans, which would allow for the evaluation of the entire land holding of a proposed subdivision (and not just the lots being created at the time). This would provide a better means of understanding the "big picture" and establish the ultimate level of development that can be accommodated.

For improved land use and maintenance, cluster systems could also be encouraged. These systems, which can result in a number of homes using one large system for treatment and/or disposal, allow more land to be left in its natural state. These cluster systems can also be easier to maintain.

Question

- *Should there be new regulatory requirements for the review of large-scale development, to guard against future problems?*

Question

- *Should management programs be put in place, to ensure adequate operation and maintenance of sewage systems in new development?*

Raw Discharges

The effects of

untreated discharges on water quality and its uses are substantial. Not only does raw sewage have the potential to impact the public's health and contaminate the water resources, it limits recreational use of receiving waters and detracts from the attractiveness of a community, impacting the tourism industry.

Although the province prohibits the construction of new outfalls discharging raw sewage, new development with connection to existing outfalls has been allowed to continue, increasing the quantity of sewage being discharged raw. Conversely, there are communities in Nova Scotia which have had development restricted by the Department of Environment and Labour because their treatment facility was not capable of handling an additional sewage load. Somehow these inequities must be addressed.

Question

- *Should development be allowed to continue through infilling and approved extensions to existing collection systems, where there is no treatment?*

Question

- *Where sewage is collected and discharged raw, treatment is essential. Is it sufficient to establish a long-term commitment for treatment or is a defined time line required? What should the respective roles of municipal and provincial levels of government be in achieving treatment?*

Financing Options

As discussed earlier,

there are success stories where communities in Nova Scotia have provided treatment for their raw discharges.

Funding from provincial and federal governments through Service Nova Scotia and Municipal Relations' Provincial Capital Assistance Program (PCAP) and the Canada / Nova Scotia Infrastructure Works Program (IW) has provided significant support. In fact, it has provided the push for many of the more recent projects.

Question

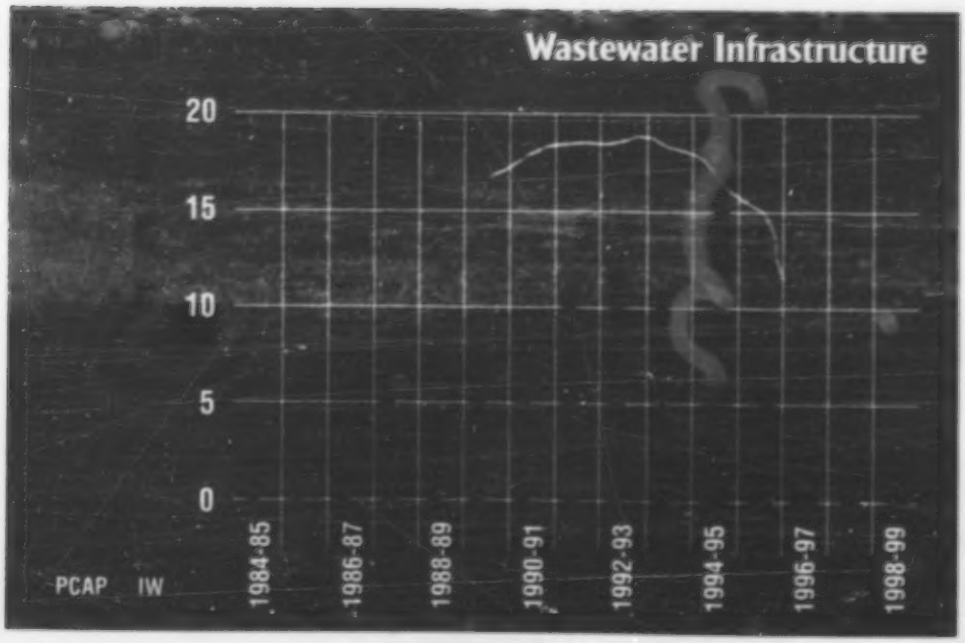
- *What options should be considered to finance the required infrastructure?*

Question

- *Should private, public partnering be supported?*

Question

- *To what degree should the concept of user pay be considered?*



It's Your Turn

The mandate of

the Nova Scotia Department of the Environment and Labour is to protect our environment. However, the final solution does not lie completely with government. It rests with each and every one of us, in accepting responsibility for managing our own waste.

This document has provided a snapshot of the sewage management issues in the province. It has been developed to inform, to bring issues forward for discussion, and most importantly to solicit your feedback. Please note that it is not our intention that your comments and suggestions be limited to the questions posed. The questions are intended to simply identify possible ideas for consideration.

Your comments and suggestions will aid us in our next step, the development of a strategy. The sewage strategy will map out an achievable plan, establishing solutions, priorities, and timelines. Implementation of the plan will be an enormous task, with a large price tag. It will take the collaboration of all levels of government, community groups and each of you. However, it is achievable. As we present this document to you, we urge you to reflect on the beauty of our province, to consider the value of our resources and the necessity to preserve and protect.

Please send your comments and suggestions to

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